

RELEASE # 541011
ARCO 5363
FEDERAL WAY
US 97531

GROUND WATER MONITORING REPORT
Atlantic Richfield
First and Second Quarters of 2007
August 16, 2007



ARCO Facility No.: 5363
 Address: 27202 Pacific Highway South, Federal Way, Washington
 Atlantic Richfield
 Environmental Business Manager: David White
 Consulting Co./Contact Person: Delta Consultants, Inc./Bryan Taylor
 Consultant Project Number: G0BKJ
 Primary Agency/Regulatory ID No.: Washington State Department of Ecology/97531

WORK PERFORMED DURING THE FIRST AND SECOND QUARTERS OF 2007:

- SAIC conducted semi-annual ground water monitoring and sampling on February 22, 2007.
- Delta prepared this semi-annual ground water monitoring report.

WORK SCHEDULED FOR THE THIRD AND FOURTH QUARTERS OF 2007:

- SAIC will conduct semi-annual ground water monitoring and sampling.
- Delta will prepare a semi-annual ground water monitoring report.

Current Phase of Project:	Monitoring	(Phase I, Add'l Assmnt RAP/CAP, Remed., etc)
Frequency of Ground Water Sampling and Monitoring:	Semi-annual	(Quarterly, etc)
Are LPH Present On-Site:	No	(Yes/No)
LPH Recovered this Reporting Period:	None	(Gallons)
Cumulative LPH Recovered to Date:	None	(Gallons)
Amount of Soil Removed to Date:	4.56 tons (drill cuttings)	(Cubic yards/tons)
Current Remediation Techniques:	Natural Attenuation	(SVES/Sparge/Pump and Treat)
Approximate Depth to Ground Water:	3.83 to 4.70	(Feet)
Ground Water Gradient:	Unknown – See Figure 3	(Direction)
	Unknown – See Figure 3	(Magnitude)

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TCP-NWRO**

The recommendations contained in this report represent Delta's professional opinions based upon the currently available information and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the client. The contract between Delta and its client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of Delta's client and the Department of Ecology. Delta will not and cannot be liable for unauthorized reliance by any other party. Other than as contained in this paragraph, Delta makes no express or implied warranty as to the contents of this report.



Bryan Taylor
Project Manager

Attachments:

- Table 1 – Summary of Ground Water Data
- Figure 1 – Site Location Map
- Figure 2 – Site Aerial Map
- Figure 3 – Ground Water Analytical Data Map – 2/22/07
- Figure 4 – MW-2 Hydrocarbon Concentrations and Water Elevations vs. Time
- Figure 5 – MW-4 Hydrocarbon Concentrations and Water Elevations vs. Time
- Test America Analytical Lab Report
- Field Data Sheets

cc: John Wietfeld, Washington State Department of Ecology, NW Region

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TABLE 1
SUMMARY OF GROUND WATER DATA
ARCO FACILITY NO. 5363
27202 PACIFIC HIGHWAY SOUTH
FEDERAL WAY, WASHINGTON

Well	TOC (feet)	Date Sampled	Depth to Water (feet)	GW Elevation (feet)	Dissolved Oxygen (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- Benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	1,2 Dibromo ethane (µg/L)	1,2 Dichloro ethane (µg/L)	TPH-G (µg/L)	TPH-D (µg/L)	TPH-O (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)	Comments
MW-1	98.23	06/11/04	19.93	78.30	2.9	<0.500	<0.500	<0.500	<1.00	<5.00	<0.010	<1.00	<50.0	NA	NA	<1.00	<1.00	P
MW-1	98.23	12/07/04	20.78	77.45	2.0	<0.200	<0.500	<0.500	<1.00	<2.00	NA	NA	<80.0	NA	NA	<1.00	<1.00	P
MW-1	98.23	02/21/05	15.75	82.48	2.7	<0.200	<0.500	<0.500	<1.00	<2.00	NA	NA	<80.0	NA	NA	<1.00	<1.00	P
MW-1	98.23	05/16/05	13.81	84.42	6.5	<0.200	<0.500	<0.500	<1.00	<2.00	<0.010	<0.500	<80.0	NA	NA	<1.00	<1.00	P
MW-1	98.23	08/02/05	18.01	80.22	2.5	<0.500	<0.500	<0.500	<1.00	<1.00	<0.010	<1.00	<50.0	NA	NA	1.8	<1.00	P
MW-1	98.23	10/21/05	18.73	79.50	2.2	<0.300	<0.500	<0.500	<3.00	<1.00	<0.010	<1.00	<50.0	NA	NA	<1.00	NA	P
MW-1	98.23	01/11/06	8.31	89.92	2.8	<0.500	<0.500	<0.500	<1.00	<1.00	<0.010	<1.00	<50.0	NA	NA	<1.00	NA	NP
MW-1	98.23	04/11/06	16.67	81.56	2.9	<0.500	<0.500	<0.500	<1.00	<1.00	<0.010	<1.00	<50.0	NA	NA	<1.00	<1.00	NP
MW-1	98.23	07/11/06	15.55	82.68	2.7	<0.500	<0.500	<0.500	<1.00	<1.00	NA	NA	<80.0	NA	NA	<1.00	<1.00	NP
MW-1	98.23	02/22/07	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-2	100.72	06/11/04	5.72	95.00	1.0	1,590	6,020	880	4,960	<5.00	0.047	<1.00	42,100	NA	NA	23.7	18.8	P
MW-2	100.72	12/07/04	9.50	91.22	1.8	3,820	11,400	1,180	6,180	<200	NA	NA	48,200	NA	NA	8.58	6.45	P
MW-2	100.72	02/21/05	5.73	95.01	NM	1520	7630	1310	6700	<100	NA	NA	44800	NA	NA	24.5	17.5	P (a)
MW-2	100.72	05/16/05	4.44	96.32	NM	99.5	3680	1280	7320	<100	<0.010	<25.0	57900	NA	NA	28.6	23.7	P
MW-2	100.72	08/02/05	6.18	94.54	NM	56.8	2590	912	3010	<2.00	<0.010	<1.00	27700	NA	NA	<1.00	30.4	P
MW-2	100.72	10/21/05	7.57	93.15	3.3	258	4,790	1170	6340	<1.00	<0.010	<1.00	43,800	NA	NA	19.6	13.9	P
MW-2	100.72	01/11/06	2.40	98.32	0.9	66.1	752	142	1,700	<1.00	<0.010	<1.00	12,800	NA	NA	5.90	NA	NP
MW-2	100.72	04/11/06	3.90	96.82	0.9	18.9	189	182	893	<5.00	<0.010	<5.00	13,200	NA	NA	5.67	1.7	NP
MW-2	100.72	07/11/06	5.05	95.67	1.3	1.70	22.0	34.3	115	<1.00	NA	NA	2,540	NA	NA	12.6	9.17	NP
MW-2	100.72	02/22/07	3.83	96.89	1.12	245	2,730	1,280	4,050	NA	NA	NA	36,200	NA	NA	NA	NA	NP
MW-3	100.08	06/11/04	6.81	93.27	2.4	1	1.45	18.4	23.0	<5.00	<0.010	<1.00	1,120	NA	NA	<1.00	<1.00	P
MW-3	100.08	12/07/04	8.80	91.28	2.2	2	1.91	50.2	26.4	<2.00	NA	NA	1,430	NA	NA	<1.00	<1.00	P
MW-3	100.08	02/21/05	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3	100.08	02/21/05	5.82	94.26	2.3	1.39	3.52	11.4	44.5	<2.00	NA	NA	2690	NA	NA	<1.00	<1.00	P
MW-3	100.08	05/16/05	6.01	94.07	4.8	0.610	2.06	15.0	27.0	<2.00	<0.010	<0.500	2870	NA	NA	<1.00	<1.00	P
MW-3	100.08	08/02/05	6.17	93.91	2.9	1.22	2.32	13.6	34.4	<2.00	<0.010	<1.00	2870	NA	NA	24.6	<1.00	P
MW-3	100.08	10/21/05	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS, (b)
MW-3	100.08	01/11/06	4.11	95.97	NM	1.2	3.67	67.0	59.8	<1.00	<0.010	<1.00	6,260	NA	NA	<1.00	NA	NP
MW-3	100.08	04/11/06	6.72	93.36	2.7	1.36	3.11	69.5	60.5	<1.00	<0.010	<1.00	6,550	NA	NA	<1.00	<1.00	NP
MW-3	100.08	07/11/06	5.89	94.19	2.5	0.520	2.83	23.5	33.4	<1.00	NA	NA	2,730	NA	NA	<1.00	<1.00	NP
MW-3	100.08	02/22/07	4.70	95.38	1.43	3.46	5.03	64.9	63.8	NA	NA	NA	5,420	NA	NA	NA	NA	NP
MW-4	99.38	06/11/04	5.71	93.67	1.1	63	453	194	1,390	<5.00	0.184	<1.00	10,400	NA	NA	1.38	<1.00	P
MW-4	99.38	12/07/04	7.37	92.01	1.8	296	182	19.5	860	<4.00	NA	NA	3,170	NA	NA	<1.00	<1.00	P
MW-4	99.38	02/21/05	6.54	92.84	2.2	4380	5510	1280	7540	<100	NA	NA	29500	NA	NA	<1.00	<1.00	P
MW-4	99.38	05/16/05	5.13	94.25	5.6	<0.200	<0.500	<0.500	<1.00	<2.00	<0.010	<0.500	<80.0	NA	NA	<1.00	<1.00	P
MW-4	99.38	08/02/05	6.04	93.34	2.0	<0.500	<0.500	<0.500	<1.00	<1.00	<0.010	<1.00	<50.0	NA	NA	<1.00	<1.00	P
MW-4	99.38	10/21/05	7.22	92.16	3.8	<0.300	<0.500	<0.500	0.540	<1.00	<0.010	<1.00	<50.0	NA	NA	<1.00	NA	P
MW-4	99.38	01/11/06	5.00	94.38	2.0	1,100	1,190	542	2,660	3.94	0.028	<1.00	14,000	NA	NA	<1.00	NA	NP
MW-4	99.38	04/11/06	6.68	92.70	3.2	33.9	37.3	46.0	153	<1.00	<0.010	<1.00	2,980	NA	NA	<1.00	<1.00	NP
MW-4	99.38	07/11/06	5.50	93.88	1.9	<0.500	<0.500	<0.500	1.48	<1.00	NA	NA	<80.0	NA	NA	<1.00	<1.00	NP
MW-4	99.38	02/22/07	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

TABLE 1
SUMMARY OF GROUND WATER DATA
ARCO FACILITY NO. 5363
27202 PACIFIC HIGHWAY SOUTH
FEDERAL WAY, WASHINGTON

Well	TOC (feet)	Date Sampled	Depth to Water (feet)	GW Elevation (feet)	Dissolved Oxygen (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- Benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	1,2 Dibromo ethane (µg/L)	1,2 Dichloro ethane (µg/L)	TPH-G (µg/L)	TPH-D (µg/L)	TPH-O (µg/L)	Total Lead (µg/L)	Dissolved Lead (µg/L)	Comments
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Notes: Benzene, toluene, ethylbenzene, total xylenes, and methyl tert-butyl ether (MTBE) analyzed by EPA Method 8021B or 8260B. Samples with MTBE detections above the laboratory method reporting limit using 8021B were re-analyzed using 8260B to confirm the MTBE concentration.

TPH-G = Gasoline-range hydrocarbons analyzed by the Northwest method NWTPH-Gx.

TPH-D = Diesel-range hydrocarbons analyzed by the Northwest method NWTPH-Dx.

TPH-O = Oil-range hydrocarbons analyzed by the Northwest method NWTPH-Dx.

1,2-Dibromoethane (EDB) analyzed by EPA Method 8011.

1,2-Dichloroethane (EDC) analyzed by EPA Method 8260B.

Total and dissolved lead analyzed by EPA Method 6020.

TOC = Top of casing elevations and ground water elevations referenced to a site specific benchmark, assigned an elevation of 100.00 feet.

ug/L = Micrograms per liter.

mg/L = Milligrams per liter.

<1.00 = Concentrations were not detected above the stated laboratory reporting limit.

NM = Not measured.

P = Purge sampling methods were utilized.

NA = Not analyzed.

LPH = Liquid Phase Hydrocarbons.

NS = Not Sampled

a = LPH was measured visually.

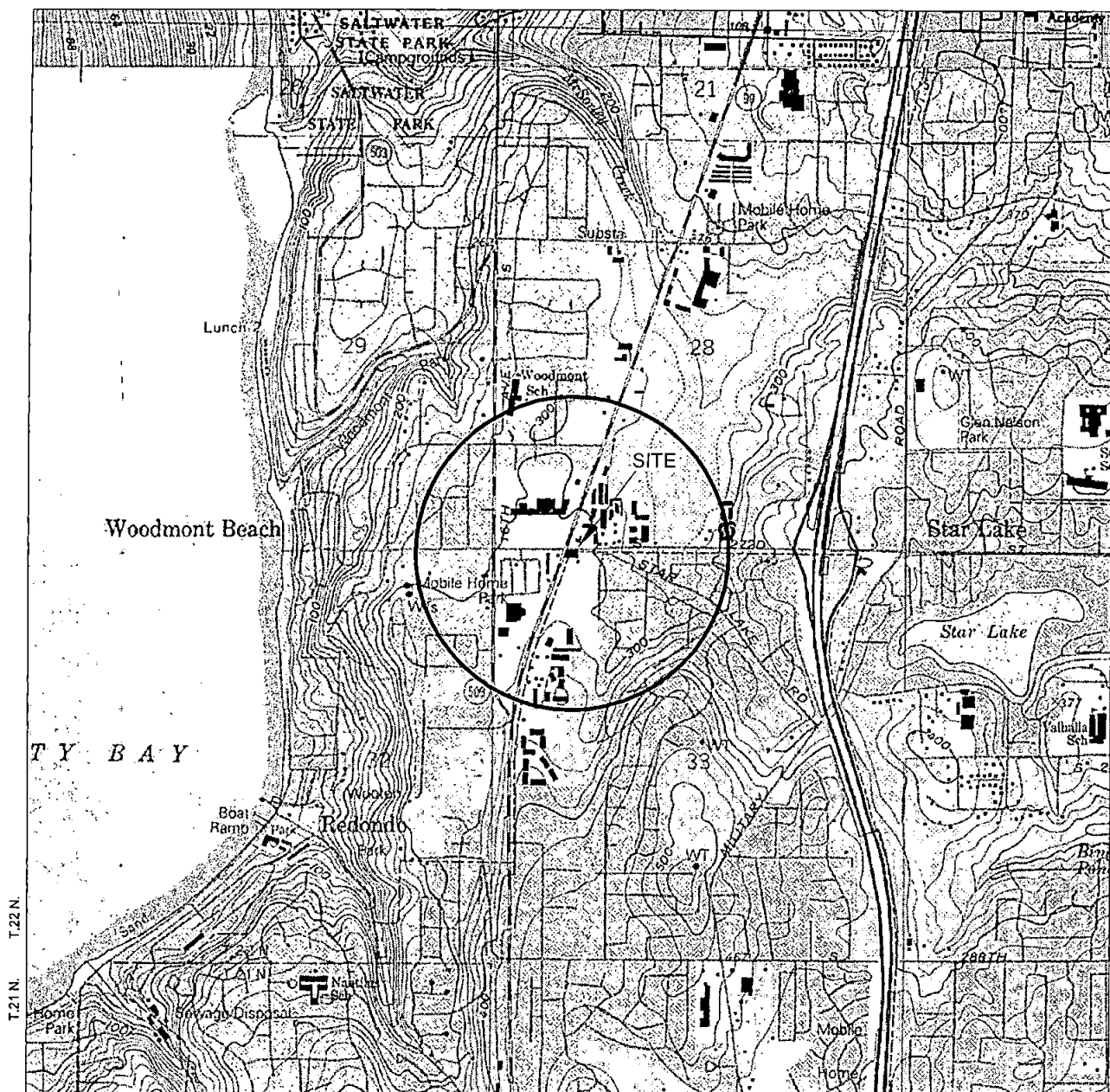
b = car parked over well

GW elevation = Ground Water elevation as calculated by TOC elevation - depth to water + (0.8 x LPH thickness).

Sampling Frequency:

1Q 2007: MW-2, MW-3

3Q 2007: MW-2, MW-3



R4E.

GENERAL NOTES:
BASE MAP FROM U.S.G.S.
POVERTY BAY, WA.
7.5 MINUTE TOPOGRAPHIC
REVISED 1994



QUADRANGLE LOCATION



SCALE 1:24,000

FIGURE 1
SITE LOCATION MAP

ARCO FACILITY NO. 5363
27202 PACIFIC HIGHWAY SOUTH
FEDERAL WAY, WA.

PROJECT NO.
AM00-506

FILE NO.
AM00506A

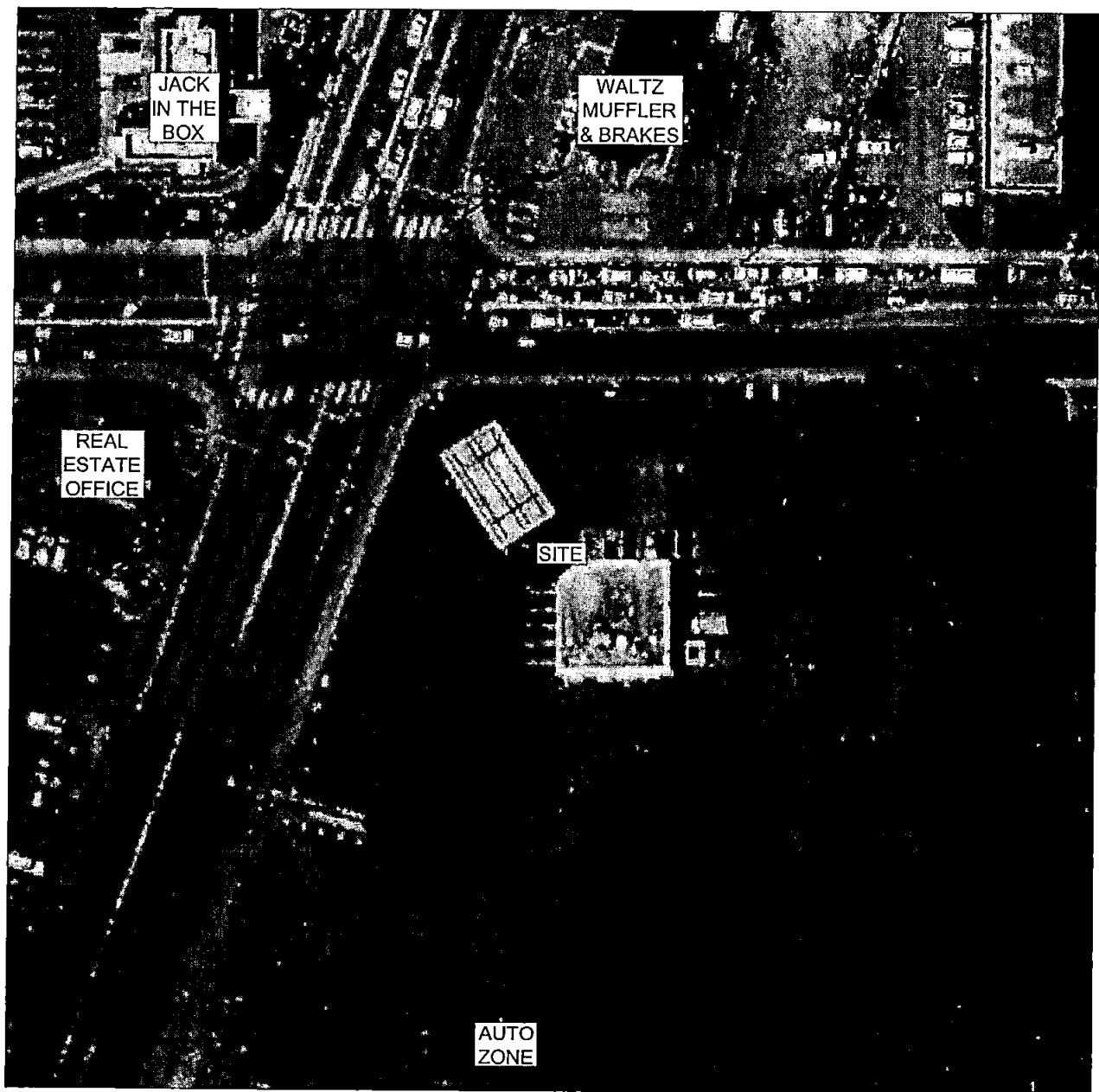
REVISION NO.
1

DRAWN BY
M.L. 8/4/04

PREPARED BY
BAB

REVIEWED BY





GENERAL NOTES:
AERIAL PHOTOGRAPH
DATED 6/13/02

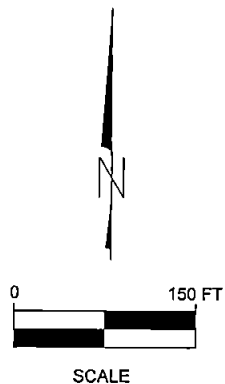


FIGURE 2
SITE AERIAL MAP

ARCO FACILITY NO. 5363
27202 PACIFIC HIGHWAY SOUTH
FEDERAL WAY, WA.

PROJECT NO.	DRAWN BY
-	M.L. 5/18/05
FILE NO.	PREPARED BY
AM85972D	SBM
REVISION NO.	REVIEWED BY
1	



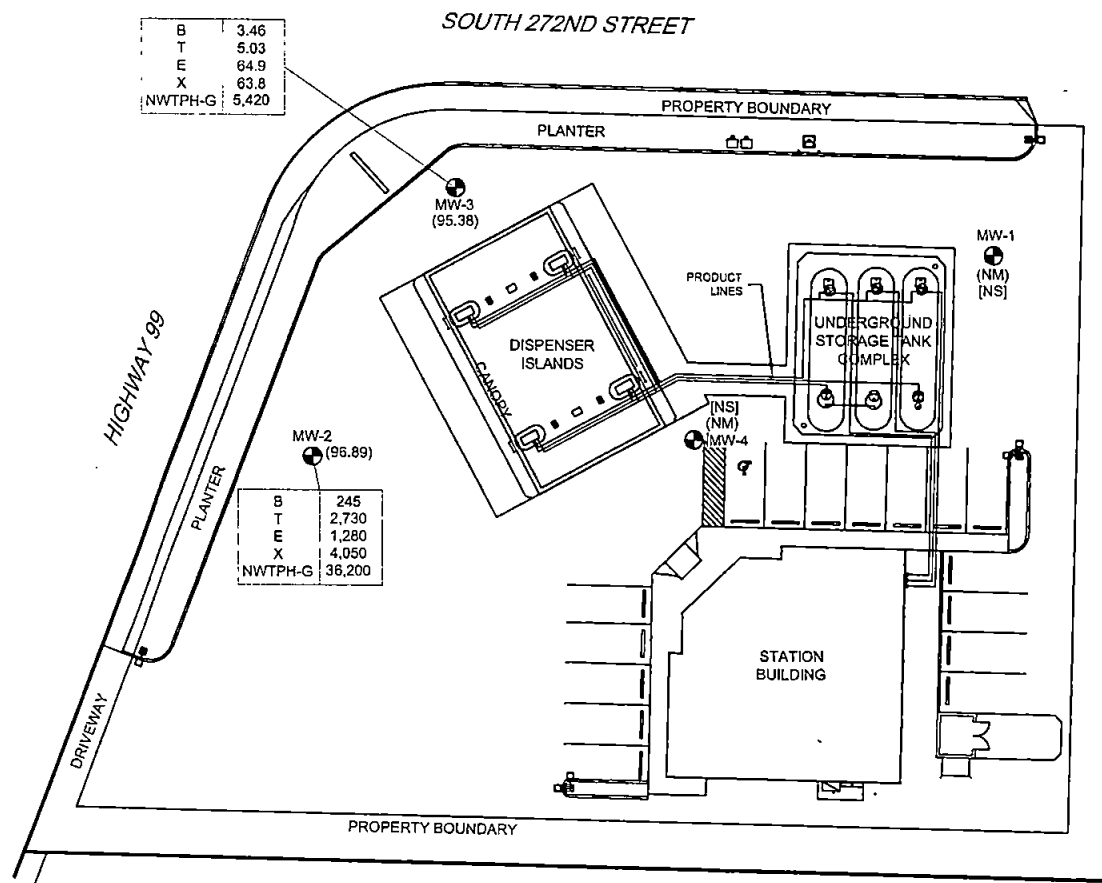


FIGURE 3
GROUND WATER ANALYTICAL DATA MAP
2/22/07

ARCO FACILITY NO. 5363
27202 PACIFIC HIGHWAY SOUTH
FEDERAL WAY, WA.

PROJECT NO. G0BKJ	DRAWN BY KYM 6/11/07
FILE NO. AR-5363-1Q07	PREPARED BY SBM
REVISION NO. 2	REVIEWED BY



Figure 4
MW-2 Hydrocarbon Concentrations and Water Elevations vs. Time
ARCO Facility No. 5363

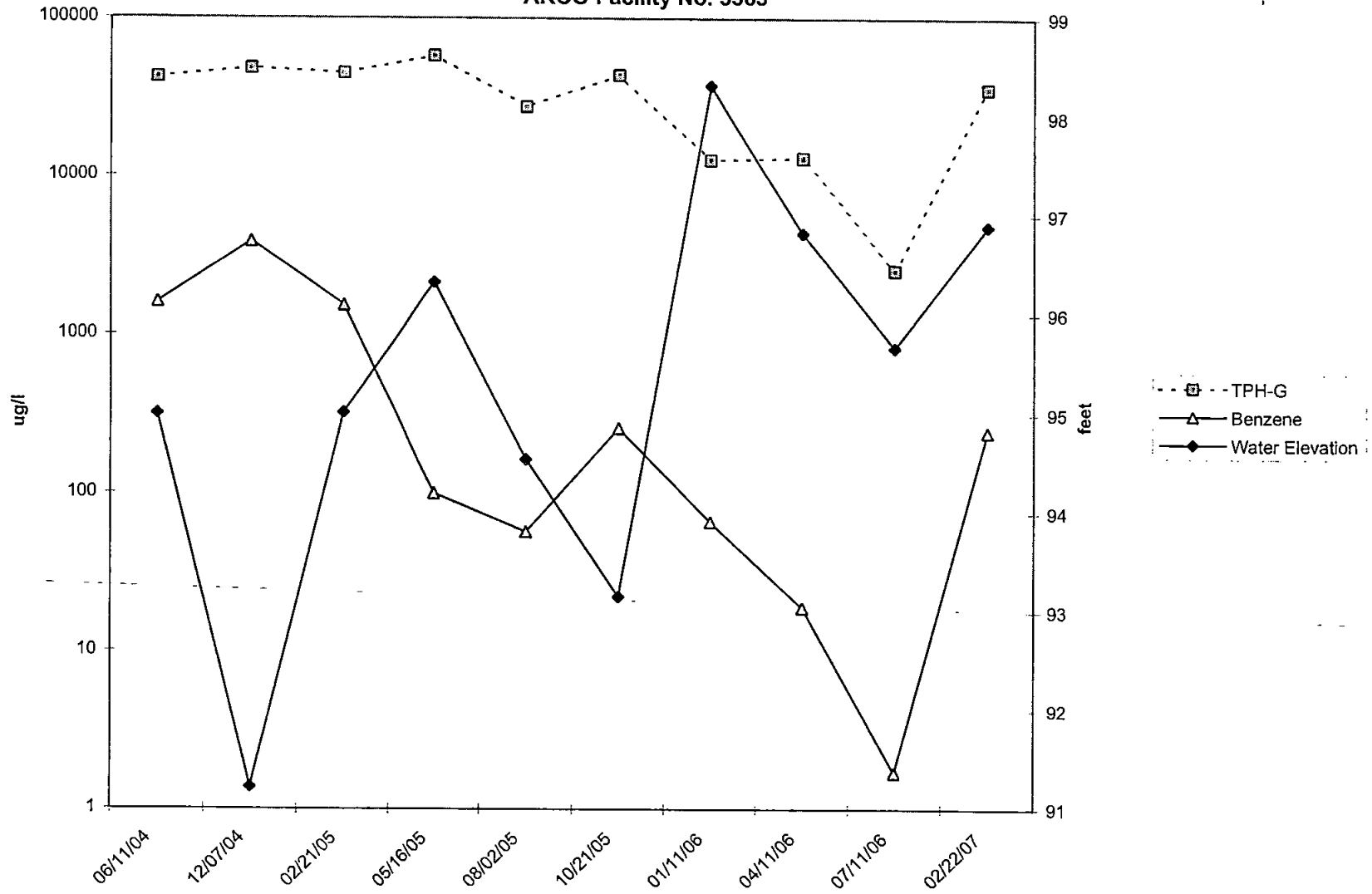
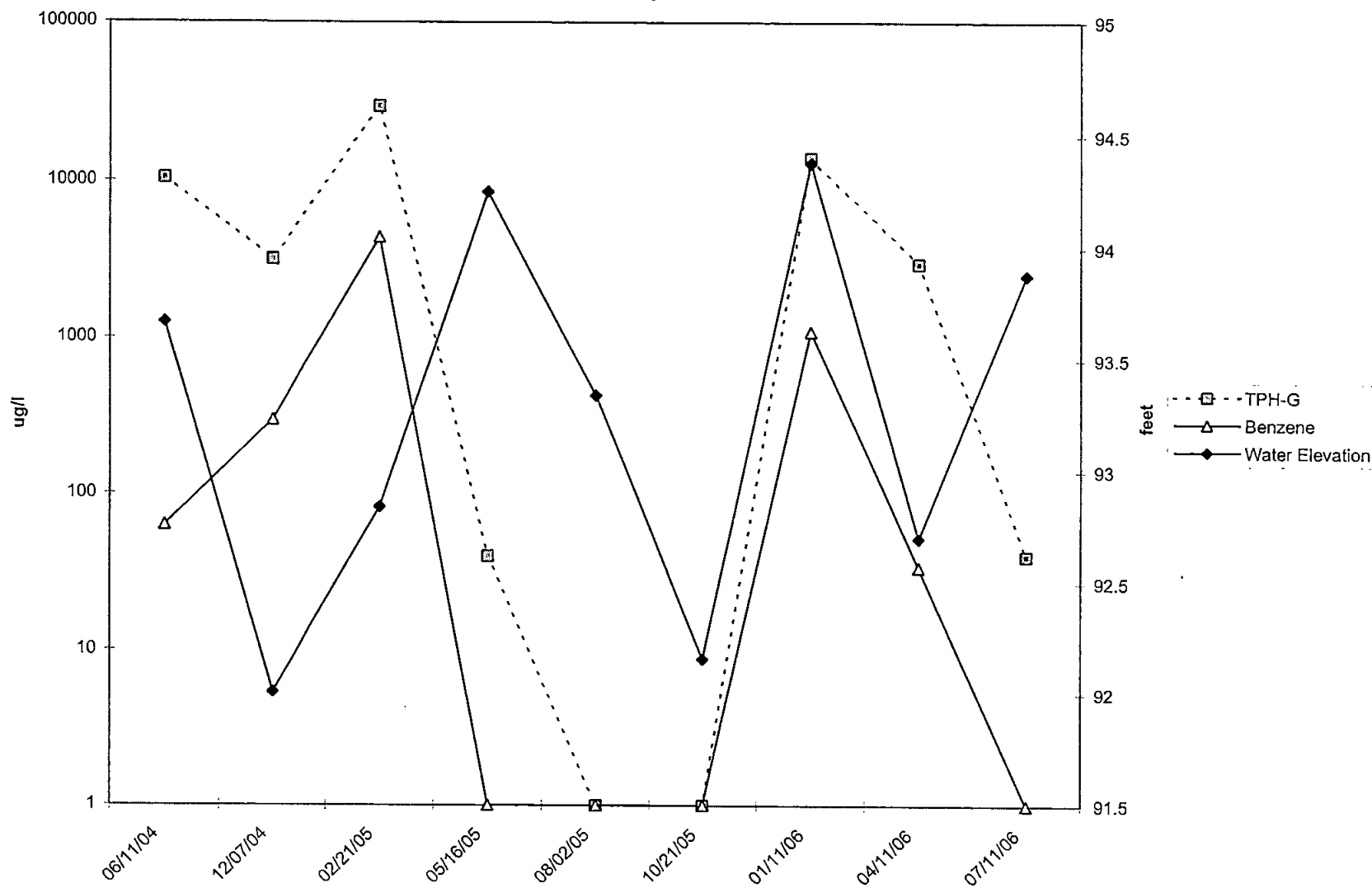


Figure 5
MW-4 Hydrocarbon Concentrations and Water Elevations vs. Time
ARCO Facility No. 5363



March 09, 2007

Mike Lange
SAIC - Bothell
18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011


RE: ARCO #5363 - 27202 Pacific Hwy. Federal Way

Enclosed are the results of analyses for samples received by the laboratory on 02/23/07 13:00.
The following list is a summary of the Work Orders contained in this report, generated on 03/09/07 16:33.

If you have any questions concerning this report, please feel free to contact me.

<u>Work Order</u>	<u>Project</u>	<u>ProjectNumber</u>
BQB0453	ARCO #5363 - 27202 Pacific Hwy	Enfos GOBKJ-0010

TestAmerica - Seattle, WA


Sandra Yakamavich, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.



SAIC - Bothell

18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011

Project Name:

ARCO #5363 - 27202 Pacific Hwy. Federal Way

Project Number:

Enfos GOBJ-0010

Report Created:

Project Manager:

Mike Lange

03/09/07 16:33

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-2-3.83	BQB0453-01	Water	02/22/07 15:18	02/23/07 13:00
MW-3-4.70	BQB0453-02	Water	02/22/07 16:20	02/23/07 13:00
TB-1	BQB0453-03	Water	02/22/07 08:00	02/23/07 13:00

TestAmerica - Seattle, WA



Sandra Yakamavich, Project Manager

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SAIC - Bothell

18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011

Project Name: **ARCO #5363 - 27202 Pacific Hwy. Federal Way**

Project Number: **Enfos GOBKJ-0010**

Project Manager: **Mike Lange**

Report Created:

03/09/07 16:33

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B

TestAmerica - Seattle, WA

Analyte	Method	Result	MDL*	MRL	Units	Dil	Batch	Prepared	Analyzed	Notes
BQB0453-01 (MW-2-3.83)		Water		Sampled: 02/22/07 15:18						
Gasoline Range Hydrocarbons	NWTPH-Gx/802 IB	36200	----	1000	ug/l	20x	7C01018	03/01/07 11:03	03/01/07 15:08	
Benzene	"	245	----	10.0	"	"	"	"	"	
Ethylbenzene	"	1280	----	10.0	"	"	"	"	"	
Xylenes (total)	"	4050	----	20.0	"	"	"	"	"	
Surrogate(s):	4-BFB (FID)		109%		58 - 144 %	1x				"
	4-BFB (PID)		104%		68 - 140 %	"				"
BQB0453-01RE1 (MW-2-3.83)		Water		Sampled: 02/22/07 15:18						
Toluene	NWTPH-Gx/802 IB	2730	----	50.0	ug/l	100x	7C01018	03/01/07 11:03	03/02/07 07:23	
Surrogate(s):	4-BFB (PID)		105%		68 - 140 %	1x				"
BQB0453-02 (MW-3-4.70)		Water		Sampled: 02/22/07 16:20						
Benzene	NWTPH-Gx/802 IB	3.46	----	0.500	ug/l	1x	7C01018	03/01/07 11:03	03/02/07 03:42	
Toluene	"	5.03	----	0.500	"	"	"	"	"	
Ethylbenzene	"	64.9	----	0.500	"	"	"	"	"	
Xylenes (total)	"	63.8	----	1.00	"	"	"	"	"	
Surrogate(s):	4-BFB (PID)		134%		68 - 140 %	"				"
BQB0453-02RE1 (MW-3-4.70)		Water		Sampled: 02/22/07 16:20						
Gasoline Range Hydrocarbons	NWTPH-Gx/802 IB	5420	----	250	ug/l	5x	7C02036	03/02/07 12:00	03/02/07 14:02	
Surrogate(s):	4-BFB (FID)		114%		58 - 144 %	1x				"
BQB0453-03 (TB-1)		Water		Sampled: 02/22/07 08:00						
Gasoline Range Hydrocarbons	NWTPH-Gx/802 IB	ND	----	50.0	ug/l	1x	7C01018	03/01/07 11:03	03/01/07 19:44	
Benzene	"	ND	----	0.500	"	"	"	"	"	
Toluene	"	ND	----	0.500	"	"	"	"	"	
Ethylbenzene	"	ND	----	0.500	"	"	"	"	"	
Xylenes (total)	"	ND	----	1.00	"	"	"	"	"	
Surrogate(s):	4-BFB (FID)		92.0%		58 - 144 %	"				"
	4-BFB (PID)		102%		68 - 140 %	"				"

TestAmerica - Seattle, WA

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report shall not be reproduced except in full, without the written approval of the laboratory.

Sandra Yakamovich

Sandra Yakamovich, Project Manager



SAIC - Bothell

18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011

Project Name: ARCO #5363 - 27202 Pacific Hwy. Federal Way
Project Number: Enfos GOBKJ-0010
Project Manager: Mike Lange

Report Created:
03/09/07 16:33

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Laboratory Quality Control Results
TestAmerica - Seattle, WA

QC Batch: 7C01018 Water Preparation Method: EPA 5030B (P/T)

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7C01018-BLK1)							Extracted: 03/01/07 11:03							
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	ND	---	50.0	ug/l	1x	--	--	--	--	--	--	03/01/07 12:25	
Benzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Toluene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Ethylbenzene	"	ND	---	0.500	"	"	--	--	--	--	--	--	"	
Xylenes (total)	"	ND	---	1.00	"	"	--	--	--	--	--	--	"	
Surrogate(s): 4-BFB (FID)		Recovery:	93.2%	Limits: 58-144%		"								03/01/07 12:25
4-BFB (PID)			99.7%	68-140%		"								"
LCS (7C01018-BS1)							Extracted: 03/01/07 11:03							
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	1010	---	50.0	ug/l	1x	--	1000	101%	(80-120)	--	--	03/01/07 12:58	
Surrogate(s): 4-BFB (FID)		Recovery:	101%	Limits: 58-144%		"								03/01/07 12:58
LCS (7C01018-BS2)							Extracted: 03/01/07 11:03							
Benzene	NWTPH-Gx/ 8021B	30.2	---	0.500	ug/l	1x	--	30.0	101%	(80-120)	--	--	03/01/07 13:31	
Toluene	"	28.9	---	0.500	"	"	--	"	96.3%	"	--	--	"	
Ethylbenzene	"	28.6	---	0.500	"	"	--	"	95.3%	"	--	--	"	
Xylenes (total)	"	85.2	---	1.00	"	"	--	90.0	94.7%	"	--	--	"	
Surrogate(s): 4-BFB (PID)		Recovery:	98.8%	Limits: 68-140%		"								03/01/07 13:31
Duplicate (7C01018-DUP1)							QC Source: BQB0522-04		Extracted: 03/01/07 11:03					
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	ND	---	50.0	ug/l	1x	ND	--	--	--	9.55% (25)		03/01/07 14:36	
Benzene	"	1.44	---	0.500	"	"	1.52	--	--	--	5.41%	"	"	
Toluene	"	0.740	---	0.500	"	"	0.844	--	--	--	13.1%	"	"	
Ethylbenzene	"	ND	---	0.500	"	"	0.572	--	--	--	16.1%	"	"	
Xylenes (total)	"	ND	---	1.00	"	"	1.15	--	--	--	22.5%	"	"	
Surrogate(s): 4-BFB (FID)		Recovery:	92.3%	Limits: 58-144%		"								03/01/07 14:36
4-BFB (PID)			101%	68-140%		"								"
Duplicate (7C01018-DUP2)							QC Source: BQB0449-03		Extracted: 03/01/07 11:03					
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	ND	---	50.0	ug/l	1x	ND	--	--	--	NR (25)		03/02/07 03:10	
Benzene	"	ND	---	0.500	"	"	ND	--	--	--	NR	"	"	
Toluene	"	ND	---	0.500	"	"	ND	--	--	--	NR	"	"	
Ethylbenzene	"	ND	---	0.500	"	"	ND	--	--	--	NR	"	"	
Xylenes (total)	"	ND	---	1.00	"	"	ND	--	--	--	NR	"	"	
Surrogate(s): 4-BFB (FID)		Recovery:	93.8%	Limits: 58-144%		"								03/02/07 03:10
4-BFB (PID)			102%	68-140%		"								"

TestAmerica - Seattle, WA

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Sandra Yakamovich

Sandra Yakamovich, Project Manager



SAIC - Bothell

18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011

Project Name: **ARCO #5363 - 27202 Pacific Hwy. Federal Way**

Project Number: **Enfos GOBJ-0010**

Project Manager: **Mike Lange**

Report Created:

03/09/07 16:33

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Laboratory Quality Control Results
TestAmerica - Seattle, WA

QC Batch: 7C01018

Water Preparation Method: EPA 5030B (P/T)

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Matrix Spike (7C01018-MS1)			QC Source: BQB0522-04					Extracted: 03/01/07 11:03						
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	1170	---	50.0	ug/l	1x	46.1	1000	112%	(75-131)	--	--	03/01/07 15:40	
Surrogate(s): 4-BFB (FID)		Recovery: 99.2%	Limits: 58-144%					03/01/07 15:40						
Matrix Spike (7C01018-MS2)			QC Source: BQB0522-04					Extracted: 03/01/07 11:03						
Benzene	NWTPH-Gx/ 8021B	35.1	---	0.500	ug/l	1x	1.52	30.0	112%	(46-130)	--	--	03/01/07 16:46	
Toluene	"	31.3	---	0.500	"	"	0.844	"	102%	(60-124)	--	--	"	
Ethylbenzene	"	32.2	---	0.500	"	"	0.572	"	105%	(56-141)	--	--	"	
Xylenes (total)	"	93.4	---	1.00	"	"	1.15	90.0	102%	(66-132)	--	--	"	
Surrogate(s): 4-BFB (PID)		Recovery: 101%	Limits: 68-140%					03/01/07 16:46						
Matrix Spike Dup (7C01018-MSD1)			QC Source: BQB0522-04					Extracted: 03/01/07 11:03						
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	1140	---	50.0	ug/l	1x	46.1	1000	109%	(75-131)	2.60%	(25)	03/01/07 16:11	
Surrogate(s): 4-BFB (FID)		Recovery: 101%	Limits: 58-144%					03/01/07 16:11						
Matrix Spike Dup (7C01018-MSD2)			QC Source: BQB0522-04					Extracted: 03/01/07 11:03						
Benzene	NWTPH-Gx/ 8021B	34.0	---	0.500	ug/l	1x	1.52	30.0	108%	(46-130)	3.18%	(40)	03/01/07 17:17	
Toluene	"	30.0	---	0.500	"	"	0.844	"	97.2%	(60-124)	4.24%	"	"	
Ethylbenzene	"	30.7	---	0.500	"	"	0.572	"	100%	(56-141)	4.77%	"	"	
Xylenes (total)	"	88.9	---	1.00	"	"	1.15	90.0	97.5%	(66-132)	4.94%	"	"	
Surrogate(s): 4-BFB (PID)		Recovery: 102%	Limits: 68-140%					03/01/07 17:17						

TestAmerica - Seattle, WA

Sandra Yakamovich

Sandra Yakamovich, Project Manager

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SAIC - Bothell	Project Name: ARCO #5363 - 27202 Pacific Hwy. Federal Way	Report Created:
18912 North Creek Parkway South, Suite 101 -	Project Number: Enfos GOBKJ-0010	03/09/07 16:33
Bothell, WA/USA 98011	Project Manager: Mike Lange	

Gasoline Hydrocarbons (Benzene to Naphthalene) and BTEX by NWTPH-G and EPA 8021B - Laboratory Quality Control Results
 TestAmerica - Seattle, WA

QC Batch: 7C02036 **Water Preparation Method: EPA 5030B (P/T)**

Analyte	Method	Result	MDL*	MRL	Units	Dil	Source Result	Spike Amt	% REC	(Limits)	% RPD	(Limits)	Analyzed	Notes
Blank (7C02036-BLK1)							Extracted: 03/02/07 12:00							
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	ND	---	50.0	ug/l	1x	--	--	--	--	--	--	03/02/07 12:18	
Surrogate(s): 4-BFB (FID)		Recovery: 93.8%		Limits: 58-144%	"								03/02/07 12:18	
LCS (7C02036-BS1)							Extracted: 03/02/07 12:00							
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	1010	---	50.0	ug/l	1x	--	1000	101%	(80-120)	--	--	03/02/07 12:50	
Surrogate(s): 4-BFB (FID)		Recovery: 102%		Limits: 58-144%	"								03/02/07 12:50	
LCS Dup (7C02036-BSD1)							Extracted: 03/02/07 12:00							
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	1090	---	50.0	ug/l	1x	--	1000	109%	(80-120)	7.62%	(25)	03/02/07 13:22	
Surrogate(s): 4-BFB (FID)		Recovery: 102%		Limits: 58-144%	"								03/02/07 13:22	
Duplicate (7C02036-DUP1)							QC Source: BQB0453-02RE1		Extracted: 03/02/07 12:00					
Gasoline Range Hydrocarbons	NWTPH-Gx/ 8021B	5540	---	250	ug/l	5x	5420	--	--	--	2.19%	(25)	03/02/07 14:34	
Surrogate(s): 4-BFB (FID)		Recovery: 116%		Limits: 58-144%	1x								03/02/07 14:34	

TestAmerica - Seattle, WA

Sandra Yakamovich

Sandra Yakamovich, Project Manager

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SAIC - Bothell

18912 North Creek Parkway South, Suite 101
Bothell, WA/USA 98011

Project Name: **ARCO #5363 - 27202 Pacific Hwy. Federal Way**
Project Number: **Enfos GOBKJ-0010**
Project Manager: **Mike Lange**

Report Created:
03/09/07 16:33

Notes and Definitions

Report Specific Notes:

None

Laboratory Reporting Conventions:

- DET - Analyte DETECTED at or above the Reporting Limit. Qualitative Analyses only.
- ND - Analyte NOT DETECTED at or above the reporting limit (MDL or MRL, as appropriate).
- NR/NA - Not Reported / Not Available
- dry - Sample results reported on a Dry Weight Basis. Results and Reporting Limits have been corrected for Percent Dry Weight.
- wet - Sample results and reporting limits reported on a Wet Weight Basis (as received). Results with neither 'wet' nor 'dry' are reported on a Wet Weight Basis.
- RPD - RELATIVE PERCENT DIFFERENCE (RPDs calculated using Results, not Percent Recoveries).
- MRL - METHOD REPORTING LIMIT. Reporting Level at, or above, the lowest level standard of the Calibration Table.
- MDL* - METHOD DETECTION LIMIT. Reporting Level at, or above, the statistically derived limit based on 40CFR, Part 136, Appendix B. *MDLs are listed on the report only if the data has been evaluated below the MRL. Results between the MDL and MRL are reported as Estimated Results.
- Dil - Dilutions are calculated based on deviations from the standard dilution performed for an analysis, and may not represent the dilution found on the analytical raw data.
- Reporting Limits - Reporting limits (MDLs and MRLs) are adjusted based on variations in sample preparation amounts, analytical dilutions and percent solids, where applicable.
- Electronic Signature - Electronic Signature added in accordance with TestAmerica's *Electronic Reporting and Electronic Signatures Policy*. Application of electronic signature indicates that the report has been reviewed and approved for release by the laboratory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

TestAmerica - Seattle, WA

Sandra Yakamavich

Sandra Yakamavich, Project Manager

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A BP affiliated company

Chain of Custody Record

174455

Project Name: ARCO #5363 - 27202 PACIFIC Hwy. SPECIAL W/F
 BP BU/AR Region/Enfos Segment: WASHINGTON PORTFOLIO
 State or Lead Regulatory Agency: WASHINGTON DEPT. OF ECOLOGY
 Requested Due Date (mm/dd/yy): STANDARD TAT

BQBO453

Page ___ of ___

On-site Time: 13:30	Temp:
Off-site Time: 17:00	Temp:
Sky Conditions:	
Meteorological Events:	
Wind Speed:	Direction:

Lab Name: <u>Test America</u>	BP/AR Facility No.: <u>5363</u>	Consultant/Contractor: <u>SAIC</u>
Address: <u>11720 North Creek Parkway N Suite 101</u>	BP/AR Facility Address: <u>13515 Ambaum Blvd Smethe</u>	Address: <u>18912 N. CREEK PKWY, STE 101</u>
Lab PM: <u>SANDRA YAKIMOVICH</u>	Site Lat/Long:	<u>ROTHELL, WA 98011</u>
Tele/Fax: <u>425 420 9200 425 420 9210</u>	California Global ID No.: <u>N/A</u>	Consultant/Contractor Project No.: <u>06-6384-07-9675</u>
BP/AR EBM: <u>TONY BROWN</u>	Enfos Project No.: <u>GOBKJ-0010</u>	Consultant/Contractor PM: <u>MICHAEL LANGE</u>
Address: <u>2010 CROW CANYON RACE STE 160</u>	Provision or OOC (circle one)	Tele/Fax: <u>(425) 452 3319</u>
<u>SAN RAMON, CA 94583 FAX 925</u>	Phase/WBS: <u>04 - MONITORING ONLY</u>	Report Type & QC Level: <u>LEVEL 1</u>
Tele/Fax: <u>925 275 3804 / (405) 569 7647 275380</u>	Sub Phase/Task: <u>03 - ANALYTICAL</u>	E-mail EDD To: <u>LANGEM@SAIC.COM</u>
	Cost Element: <u>05 - SUBCONTRACTED COST</u>	Invoice to: Consultant or BP or Atlantic Richfield Co. (circle one)

Lab Bottle Order No:				Matrix			Laboratory No.	No. of Containers	Preservative					Requested Analysis								Sample Point Lat/Long and Comments
Item No.	Sample Description	Time	Date	Soil/Solid	Water/Liquid	Air			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	Methanol	NWTPH-6X	BTEX (80210)							
1	MW-2-3.83	1518	2/22/07		+			4						X	X							BTEX, GAS ONLY - NO PERME
2	MW-3-4.70	1620			↓			4						↓	↓							BTEX, GAS ONLY - NO PERME
3	TB-1	0800			↓			1						↓	↓							
4																						
5																						
6																						
7																						
8																						
9																						
10																						

Sampler's Name: <u>SWARTES / JPAYNE</u>	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: <u>SAIC</u>	<u>[Signature]</u>	<u>2/22/07</u>	<u>13:01</u>	<u>[Signature] TH</u>	<u>2/23</u>	<u>13:00</u>
Shipment Date:						
Shipment Method:						
Shipment Tracking No:						
Special Instructions:						
Custody Seals In Place: Yes / No	Temp Blank: Yes / No	Cooler Temp on Receipt: <u>2.7</u> F/C	Trip Blank: Yes / No	MS/MSD Sample Submitted: Yes / No		

Laboratory

BP/AR Form 5 10/11/2006

BPRCO Groundwater Sampling Form

Facility Location: 27202 Pacific Highway S Federal Way, WA	
Station #: 5363 - 06-6384-00-9675-970	Field Technician: <u>J. Ward, J. Payne</u>
Well Identification: <u>MW-2</u>	Date: <u>2/22/07</u>
Well Diameter (in): <u>(2)</u> 3 4 6 8	Depth to Water (DTW) (ft bgs): <u>3.83</u>
Thickness of SPH (ft): <u>—</u>	Depth to SPH (ft bgs): <u>—</u>
Water Column Height(ft): <u>—</u>	Total Depth of Well (ft bgs): <u>30.33</u>

Purging Info and Calculations:	
Purge Method: <u>Bailer</u> Disposable Bailer Electric Submersible Extraction Pump Other: _____	Sample Method: <u>Bailer</u> Disposable Bailer Extraction Port Other: _____
Top of Screen: _____ If well is listed as a no-purge @XX feet, confirm that water level is below the top of screen. Otherwise, the well must be purged.	
Casing Volume (gal): <u>NO PURGE</u> Specified Volumes: _____ = Calculated Purge (gal): _____	
Start Time: _____ Stop Time: _____	
Conversion Factors (gal/ft): <u>2" = 0.17</u> 3" = 0.38 4" = 0.66 6" = 1.5 8" = 2.6 Other = radius ² * 0.163	

Purge:	Time	Temp (oC)	pH	Conductivity (mS)	Volume Removed (gal)	Turbidity
	<u>15:14</u>	<u>12.4</u>	<u>6.56</u>	<u>406</u>	<u>0</u>	<u>73</u>
<u>John Ward</u> <u>2/22/07</u>						
D.O. (if req'd):	Pre-purge:	<u>1.12</u>	mg/L	Post-purge:	<u>—</u>	mg/L
O.R.P. (if req'd):	Pre-purge:	<u>—</u>	mV	Post-purge:	<u>—</u>	mV
Did Well dewater? Yes <u>(No)</u>				Actual Purge volume (gal): <u>6</u>		

Other Comments: slight sheen

Sample Info:	
Sample ID: <u>MW-2-3.83</u>	Sample Date and Time: <u>2/22/07 15:18</u>
Sample Containers and Selected Analysis: <u>4 40ml VOAs</u>	

Purge Water Stored/Disposed of Where/How: 55 gal drums aside

Signature: John Ward Date: 2/22/07

QA Signature: _____ Date: _____

BFO RCO Groundwater Sampling Form

Facility Location: 27202 Pacific Highway S Federal Way, WA	
Station #: 5363 - 06-6384-00-9675-970	Field Technician: <u>Justin Scott, S. Payne</u>
Well Identification: <u>MW-3</u>	Date: <u>2/22/07</u>
Well Diameter (in): <u>2</u> 3 4 6 8	Depth to Water (DTW) (ft bgs): <u>4.70</u>
Thickness of SPH (ft): <u>-</u>	Depth to SPH (ft bgs): <u>-</u>
Water Column Height(ft): <u>-</u>	Total Depth of Well (ft bgs): <u>29.78</u>

Purging Info and Calculations:

Purge Method: <u>Bailer</u> Disposable Bailer Electric Submersible Extraction Pump Other: _____	Sample Method: <u>Bailer</u> Disposable Bailer Extraction Port Other: _____
---	--

If well is listed as a no-purge @XX feet, confirm that water level is below the top of screen. Otherwise, the well must be purged.

Top of Screen: _____

Casing Volume (gal): NO PURGE X Specified Volumes: _____ = Calculated Purge (gal): _____

Start Time: _____ Stop Time: _____

Conversion Factors (gal/ft): 2" = 0.27 3" = 0.38 4" = 0.66 6" = 1.5 8" = 2.6 Other = radius² * 0.163

Purge:	Time	Temp (oC)	pH	Conductivity (mS)	Volume Removed (gal)	Turbidity
	1615	11.2	7.46	471	<u>0.22</u> JP 2/22/07	22
D.O. (if req'd):	Pre-purge:	1.43	mg/L	Post-purge:		mg/L
O.R.P. (if req'd):	Pre-purge:	-	mV	Post-purge:	-	mV

Did Well dewater? Yes No Actual Purge volume (gal): 0

Other Comments: _____

Sample Info:

Sample ID: <u>MW-3-4.70</u>	Sample Date and Time: <u>2.22.07 1620</u>
Sample Containers and Selected Analysis: <u>4 40ml VOA</u>	

Purge Water Stored/Disposed of Where/How: 55 gal DM ON SITE

Signature: [Signature] Date: 2.22.07

QA Signature: _____ Date: _____